EFFECTIVENESS OF CRYOTHERAPY ON ARTERIOVENOUS FISTULA PUNCTURE RELATED PAIN AMONG CLIENTS UNDERGOING HEMODIALYSIS IN A SELECTED HOSPITAL AT COIMBATORE.

COIMBATORE

A DISSERTATION SUBMITTED TO THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY, CHENNAI IN PARTIAL FULFILMENT OF REQUIREMENT FOR THE DEGREE OF

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By

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DEDICATION

The book is dedicated to my family members, who guided and supported me in all my activities.

I dedicate this book to my beloved parents

Mr.R.Ramdoss and Mrs.R.Lakshmi.

I dedicate this book to my beloved Husband

Mr. S.Murali B.Com.,

I submit this credit to my beloved Sister

Mrs.M.Rajeshwari M.Com.,

I submit this credit to my lovely Daughter

Baby.M.S.Poorvika

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ABSTRACT

The main aim of the present study was to evaluate the " Effectiveness of cryotherapy on AVF puncture related pain among clients undergoing hemodialysis.

The objectives of the study were;

To evaluate the effectiveness of cryotherapy on AVF puncture related pain among clients undergoing hemodialysis.

To determine the association between level of ArterioVenous Fistula puncture related pain among clients undergoing hemodialysis with their selected demographic variables (Age, Sex, Educational status, Duration of illness, and Frequency of dialysis per month).

The research design adopted was quasi experimental pretest posttest design with control group. The conceptual framework for this study was based on Modified Katharine Kolcaba's theory of comfort (1994). The study was conducted in SPT hospitals, at Coimbatore.

Non-probability purposive sampling technique was adopted to select the desired sample. The sample size was 60. As an intervention, cryotherapy was administered for the experimental group. The data was collected through Standardized Numerical Pain Assessment scale.

The collected data were analyzed by using both descriptive and inferential statistical methods. 't' test was used to evaluate the effectiveness of cryotherapy on AVF puncture related pain among clients undergoing hemodialysis.

The finding of the study revealed that cryotherapy helps in decreasing the level of AVF puncture related pain among clients undergoing hemodialysis.

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Introduction

CHAPTER-I

INTRODUCTION

"The aim of the wise is not to secure the pleasure, but

to avoid pain''

-Aristotle

Background Of The Study

The kidney is such an important organ, yet most people have a little idea about its crucial role in the body. Consequently, we unknowingly distress this vital organ, mainly through poor lifestyle habits and choices. Most people are born with two, but it is possible to survive with only one healthy kidney. These two powerful organs work on a continuous basis, ridding the body of harmful toxins. They are unbelievably important and if they become damaged or diseased, life will be changed significantly. They play a crucial role in maintaining homeostasis and overall health.[N7]

Recent statistics indicate that renal failure is increasing. The incidence of kidney failure (or Chronic Kidney Disease) has doubled in last 15 years. It is estimated that currently there are over 1 million people worldwide who are alive on dialysis or with a functioning graft. [N7]

Chronic Kidney Disease is an international medical problem that doesn't differentiate between social and economic borders. It is particularly cruel in developing countries, such as Africa and India, where delayed diagnosis, lack of funds have created what is tantamount to a death sentence for many patients diagnosed with End Stage Renal Disease. [N11]

Chronic Renal Failure is a devastating medical, social, and economic problem for both patients and their families in India. Most Chronic Kidney Disease patients reporting to tertiary care centers in India are in the final stage where renal replacement therapy is the only option at that stage. Hemodialysis is the most frequently used renal replacement therapy and ArterioVenous Fistula is the "GOLD STANDARD" for vascular access in hemodialysis patients. [N9]

Everyone has experienced some type or degree of pain, yet the concept of pain is difficult to communicate. The experience of pain is complex, involving emotional, and cognitive components. Pain control is important because pain can affect appetite, sleep, energy, ability to do things. Pain is considered as the 5th vital sign. The recommended hierarchy of management should consist of non pharmacological treatment as first, then drugs and if necessary, surgery. There are various non pharmacological methods that can help to relieve the pain perception such as distraction, biofeedback, cryotherapy, hot application, music therapy, laughter therapy, touch therapy etc. [N11]

Pain inflicted by the insertion of large cannulae into the ArterioVenous Fistula is a significant cause of concern for both children and adults on regular hemodialysis. Although ArterioVenous Fistula puncturing causes pain, local anesthesia is not frequently used due to concerns of vasoconstriction, burning sensation, scaring, and infection. In India there are 700 dialysis centers with a total of 4,000 dialysis machines predominantly in the private sector. There are around 20,000 patients undergoing dialysis at these centers per month. [N18]

Need For The Study

'Pain is such an uncomfortable feeling that even a

tiny amount of it is enough to ruin every enjoyment'

- **Will Rogers**

According to the World Health Organization (WHO) Global Burden Of Disease Project, diseases of the kidney and urinary tract contribute to approximately 8,50,000 deaths every year. [N11]

WHO estimates that Chronic Kidney Disease is the 12th leading cause of death and 17th cause of disability. In India, The National Kidney Foundation estimates approximately 2,00,000 people go into terminal Kidney Failure annually. [N11]

In India, the projected number of deaths due to Chronic Kidney Disease will rise from 3.78 million in 1990 to an expected 7.63 million in 2020. The treatment modalities for End Stage Renal Disease are hemodialysis, peritoneal dialysis and renal transplantation. [J6]

At the end of 2004, 1,783,000 patients world wide were receiving treatment for End Stage Renal Disease, of which 77% were on dialysis and 23% had renal transplant. The cost of each hemodialysis session in India varies from Rs.150/- in government hospitals to Rs.2000/- in some corporate hospitals. The monthly cost of hemodialysis in most private hospitals average Rs.12,000/- per month and yearly cost of dialysis is Rs.1,40,000/-. [N18]

City	No of Dialysis Centres	No. Of Dialysis Machines	No. Of Dialysis per Month	Cost of Dialysis per session
Delhi	79	490	28,500	1600
Mumbai	112	600	40,000	750
Chennai	44	146	10,220	1200
Calcutta	36	250	20,000	1100

(Indian Journal of Nephrology, 2007)

Vascular access for hemodialysis are Arterio Venous Fistula, Arterio Venous Graft which are permanent access and venous catheter which is a temporary access. On an average, a patient on maintenance hemodialysis undergoes ten ArterioVenous Fistula punctures a month and would continue to do so throughout their lifetime or until a successful renal transplant. Client's comfort with the procedure is therefore of utmost importance for long-term compliance with the treatment. The cost of an AV Fistula construction is Rs.6000 to 20,000 from a Government hospital to varying grades of private hospitals. [N18]

Fliss.E.M, Murtagha,et ai., (2006) [N15] conducted a prevalence study to describe the symptoms prevalence in ESRD population on dialysis. Fatigue 71% (12% to97%), pruritus 55% (10% to 77%), constipation 53% (8% to57%), anorexia 49% (25% to61%), pain 47% (8% to82%),sleep disturbance 44% (20% to 83%), anxiety 38%, dyspnea 35%, and nausea 33%.

Research evidence shows that cutaneous stimulation is an independent nursing intervention that is advocated to minimize the pain. The large intestine meridian is an acupressure point located on the back side of the hand between the thumb and the

index finger. The energy meridian pathway is bilateral and begins in the surface of the skin at the root of the fingernail. It courses on the external part of the arm. The outward end of the shoulder blade is crossed. Then the meridian leaves the skin surface to connect with the lower part of the lung and transverse colon. It then returns to the skin surface of the chin. Its dominant uses are to relieve pain in the shoulder and arm, rigidity of neck, scapula, and eye diseases. [N8]

Cryotherapy is Greek word in which 'cryo' means cold, and therapy means "to cure". Cryotherapy is a treatment in which the patients are exposed to extreme cold for short duration. The immediate effect of skin cooling and analgesia lasts for 5minutes by the release of endorphins can have lasting effect, where the pain and signs of inflammation are found suppressed for a week. [N10]

Cryotherapy induces its effects both locally and at the level of the spinalcord. The topical cold treatment reduces the temperature of the skin and underlying tissues to the depth of 2-4cm, decreasing activation threshold of tissue nociceptors and the conducting velocity of pain nerve signals which results in a local anesthetic effect called cold induced neuropraxia. [N5]

Ice massage reduces sensation, including pain sensation, by slowing the transmission of sensory message from local nerve fibers to the brain. It reduces the inflammation.. It the slows the transmission, motor massage the train to the local nerve fibers known as cryostretch. [N5]

Studies have thrown light on the fact that cryotherapy is equally effective in alleviating pain as a cutaneous stimulation technique. This study is therefore undertaken to look at the effect of cryotherapy on arteriovenous fistula puncture related pain among clients undergoing hemodialysis.

Statement Of The Problem

Effectiveness Of Cryotherapy On Arterio Venous Fistula Puncture Related Pain Among Clients Undergoing Hemodialysis In A Selected Hospital At Coimbatore.

Objectives Of The Study

- To evaluate the effectiveness of cryotherapy on level of ArterioVenous Fistula puncture related pain among clients undergoing hemodialysis.
- To determine the association between level of ArterioVenous Fistula puncture related pain among clients undergoing hemodialysis with their selected demographic variables (Age, Sex, Educational status, Duration of illness, and Frequency of dialysis per month).

Hypotheses

H1 Cryotherapy is effective in reducing Arteriovenous Fistula puncture related pain among clients undergoing hemodialysis.

H2 There is significant association between level of Arterio Venous Fistula puncture related pain among clients undergoing hemodialysis with their selected demographic variables (Age, Sex, Educational status, Duration of illness, Frequency of dialysis per month).

Operational Definitions

Effectiveness

It refers to the outcome of cryotherapy in terms of reduction in the level of Arterio Venous Fistula puncture related pain among clients undergoing hemodialysis.

Cryotherapy

A Cryotherapy is a cold application done with ice cubes wrapped in a glove on the web between the thumb and index finger of the hand not having Arterio Venous Fistula (Contra Lateral Arm) started 10 minutes before the puncturing procedure and continued throughout the procedure.

Arterio Venous Fistula

An Arterio Venous fistula is the connection of a vein and artery usually in the forearm and upperarm, to allow access to the vascular system for hemodialysis as a treatment of chronic renal failure, herein after referred as AVF.

Arterio Venous Fistula Puncture

It is the puncturing of the fistula by needle prick to withdraw the blood for dialysis and to reinfuse the cleaned blood into the body.

AV Fistula Puncture Related Pain

Arterio Venous Fistula Puncture Related Pain is an unpleasant subjective sensory and emotional experience associated with ArterioVenous Fistula puncture which is measured by Standardized Numerical Pain Assessment Scale.

Hemodialysis

A medical procedure that uses a special machine (a dialysis machine) to filter waste products from the blood and to restore normal constituents to it.

Assumptions

- Cryotherapy has influence on Arterio Venous Fistula puncture related pain.
- Cryotherapy has no adverse effect for Arterio Venous Fistula puncture related pain.
- Cryotherapy improves the physical, mental well being of the clients undergoing hemodialysis.
- Cryotherapy is a simple measure to reduce ArterioVenous Fistula puncture related Pain.

Delimitations

- The study is delimited to the clients who are admitted and certified by the Nephrologist as End Stage Renal Disease and undergoing hemodialysis via ArterioVenous Fistula.
- The data collection period is limited to six weeks.

Projected Outcome

- The Study will help the nurses to assess the ArterioVenous Fistula puncture related pain level with the use of standardized numerical pain assessment scale.
- The Study will help the nurses to identify the effectiveness of cryotherapy on Arterio Venous Fistula puncture related pain.

- The study findings will help the nurses to practice cryotherapy as an intervention for reducing Arterio Venous Fistula puncture related pain.
- The study findings will help to improve the quality of life among clients with ArterioVenous Fistula puncture related pain.

Review of literature

CHAPTER-II

REVIEW OF LITERATURE

The review of literature in a research report is a summary of current knowledge about practice problem (Nancy and Burns 2002). A literature review is an organized written presentation of what has been published on a topic by the scholars. The task of reviewing literature involves the identification, selection, critical analysis and reporting of existing information on the topic of interest.

The literature found relevant and useful for the present study has been organized under the following headings.

- Literature related to ArterioVenous Fistula.
- Studies related to pain during ArterioVenous Fistula puncture.
- Studies related to Cryotherapy.
- Studies related to effectiveness of Cryotherapy on pain.
- Studies related to effectiveness of Cryotherapy on ArterioVenous Fistula puncture related pain.
- Unpublished articles.

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Literature Related to Arterio Venous Fistula

Hemodialysis requires access to the blood stream. Various type of temporary and permanent devices are in clinical use. The Arteriovenous fistula is created by surgically visualizing a peripheral artery and vein and joining the two vessels together. The high arterial flow creates a swelling of the vein, or a pseudoaneurysm, at which point a large bore needle can be inserted to obtain arterial outflow to the dialyzer. Inflow is accomplished by the second large bore needle inserted in to

peripheral vein distal to the fistula. If the patient's vessels are adequate fistulas are the preferred mode of access because of the durability of blood vessels, relatively few has complications and less need for revision compared with other access methods. (Linda D. Urden et al., 2004).[B11]

For hemodialysis to be performed, a vascular access route is required. Dialysis treatments necessitate the easy availability of large amount of blood flow, atleast 250 to 350 ml/mt, usually for a period of 3-4 hours. Normally the body cannot provide this type of circulatory access without surgical revision of blood vessels. An internal access is preferred for most clients undergoing long term hemodialysis. There two common choices, an internal Arteriovenous fistula and Arteriovenous Graft. [B6]

Arterivenous fistula are formed by the anastomosis of an artery and a vein. The most commonly used vessels are the radial or brachial artery and cephalic vein of of the non dominant arm. This process increases the blood flow through the vein to 250-400ml/mt, the amount required for dialysis to be effective. Sometime is necessary for an Arteriovenous fistula to develop and the amount of time required for the fistula to mature varies. Primary fistula may not be suitable for as long as 4 months. Therefore vascular access must be planned accordingly. (Donna D. Ignatavicius et al.,1991). [B6]

Studies Related to Pain During Arterio Venous Fistula Puncture

Jordi Calls Ginesta et.al.,(2009) [N1] conducted a prospective cohort study in Canada to evaluate the prevalence of pain among hemodialysis patients. The patients were asked to complete the questionnaire that was incorporated with Brief Pain Inventory. The result revealed that 50% of patients reported pain during hemodialysis

and is not being effectively managed. The study concluded that development of effective pain management strategies, appropriate education, is necessary to improve the quality of life for hemodialysis patients.

Figueired.A.E. et.al.,(2008) [N8] has conducted a prospective study in Brazil to evaluate the pain among hemodialysis patient. The study revealed that patients with ESRD undergoing hemodialysis are repeatedly exposed to stress and pain from approximately 300 punctures per year through their Arterio Venous Fistula. Repeated Arterio Venous Fistula punctures lead to a considerable degree of pain due to caliber & length of the level of fistula needle. The study concluded that the buttonhole technique caused a mean degree of pain of 2.4 compared to using of conventional rope ladder technique 3.4.

Alan Paul et.al., (2007) [N2] conducted a descriptive study in Spain to evaluate the pain among 27 hemodialysis patients by using Visual Analog Scale . It was concluded that pain in hemodialysis is very frequent and several differences appear between intradialytic and chronic pain.

Crespo Montero R., Edtna Erca J., (2004) [N3] has conducted an experimental study in Spain to evaluate the effect of needle bevel position on the degree of pain and skin damage in an Arterio Venous Fistula puncture, among 48 hemodialysis patients by using analogue visual scale and descriptive verbal scale. The study concluded that pain was greatest when the needle was punctured with the bevel facing upward rather than downward.

Donald Schon et.al,(2003) [N11] conducted a prospective study to assess the prevalence of Arterio Venous Fistula usage and pain during hemodialysis. The study concluded that buttonhole technique cannulation is less painful and allowing patients to eliminate the use of anesthetics.

Studies Related to Cryotherapy

Okeke.Z, et.al (2009) [J8] conducted an experimental study in USA to evaluate the effectiveness of cryotherapy on delaying postoperative hemorrhage and reducing post operative pain among 60 clients undergoing percutaneous renal surgery. The study concluded that cryotherapy decreased postoperative hemorrhage, length of hospitalization and postoperative pain.

Gore.J.L, et.al., (2005) [J6] conducted a descriptive study in USA to evaluate the effectiveness of cryotherapy on renal tumors among 4 patients who underwent laparoscopy assisted percutaneous cryotherapy to treat small renal tumors. The study concluded that laparoscopy assisted percutaneous cryotherapy is a feasible treatment option for small renal tumor.

Powell.T, et.al, (2005) [J9] conducted a retrospective study in USA to evaluate the development of minimally invasive approaches to renal cell carcinoma such as renal cryotherapy among 25 patients with small peripheral renal lesion. The study concluded that renal cryotherapy is a viable option for nephron sparing surgery in small peripheral renal lesions and the procedure is well tolerated in patients who are not good candidates for open surgical approaches.

Yasumitsu Ohkoshi, et.al.,(2001) [J12] conducted a prospective and randomized study in Lousiana to evaluate the effectiveness of cryotherapy on intraarticular temperature and postoperative care among 21 patients undergone anterior cruciate ligament reconstruction surgery. The study revealed that the pain score and the number of times an analgesic to be administered were lower in experimental group than in control group.

A randomized cohort study (2001) [N10] was conducted in Itally to evaluate the cryotherapy for retinopathy of prematurity among 291 pre term children. The study concluded that, eyes that had received cryotherapy were less likely to be blind.

Andrew.L, et.al., (2006) [N5] conducted a retrospective study in USA to evaluate the effectiveness of transcatheter cryotherapy for the treatment of SupraVentricular Tachyarrhythmias among 81 children. The study concluded that cryoablation is a safe and effective alternative for the treatment of SupraVentricular Tachyarrhythmias in children.

Rusciani.L, et.al,(2006) [N6] conducted a retrospective study in Itally to evaluate the efficacy of cryotherapy in the treatment of keloids among 135 patients. The study concluded that cryotherapy is the most effective, safe, economic and easy to perform monotherapy to treat keloids.

Studies related to Effectiveness of Cryotherapy on Pain Reduction

Shin.Y.S. et.al.,(2009) [J10] conducted randomized controlled trial in Korea to evaluate the effect of cryotherapy on pain reduction among 97 craniotomy patients by using visual analogue scale. The result has shown that pain had significantly

decreased after 3 days of cryotherapy. The study had concluded that Cryotherapy can control pain, cyclic edema and facial ecchymosis after craniotomy.

Braun .K.P, Brookman – Amissah .S, (2009) [J10] conducted prospective study in Germany to determine the effectiveness of whole body Cryotherapy among 6 patients with inflammatory rheumatic disease by using Visual Analogue Scale. The study has concluded that whole body Cryotherapy is an effective concept in the treatment of inflammatory rheumatic diseases.

Chou.S.Y, Liu.H.E, (2008) [J5] conducted a Quasi experimental study in China to compare the effectiveness between moist and dry Cryotherapy in reducing pain among 48 patients who have undergone orthognatic surgery. The result shown that both moist and dry Cryotherapy reduced post operative disconjent effectively. But moist cryo was more effective in reducing postoperative local heat, pain and swelling than the dry cryotherapy.

Algajly.A.A, George.K.P,(2007) [J1] conducted an experimental study in Manchester Metropolitan University to determine the impact of the application of Cryotherapy on Nerve Conduction Velocity (NCV), Pain Threshold (PTH) and Pain Tolerance (PTO) among 23 adult male sports players by using pressure algometer. The results showed that NCV was significantly reduced and increased PTH and PTO. The study concluded that there is significant decrease in NCV after cryotherapy.

Arikan.O.K.M, Birol.A, et.al.,(2006) [J3] conducted a prospective randomized controlled study in Turkey to evaluate the effectiveness of Cryotherapy in pain

reduction among patients of minor form of recurrent aphthous stomatitis by using a 6 point scale . The result showed that there was less pain in aphthous stomatitis receiving Cryotherapy. The study concluded that Cryotherapy has beneficial analgesic effect in recurrent oral aphthous stomatitis.

Quattrin.R, et. al., (2005) [N9] has conducted a quasi experimental study in USA to evaluate the use of ice massage of the acupressure energy meridian point large intestine 4 (LI4) to reduce labor pain during contractions among antenatal mothers by using Visual Analog Scales (VAS) and the McGill Pain Questionnaire. The study results suggest that ice massage is a safe, noninvasive, non pharmacological method of reducing labor pain.

Laureano Filho.J.R, et. al.,(2005) [J7] conducted a preliminary study in Brazil to evaluate the effectiveness of Cryotherapy among 14 patients in reducing undesirable consequences after mandibular third molars extraction at different times. Wilcoxon nonparametric signed rank test was used to assess the pain level. The results have shown that Cryotherapy was effective in reducing swelling and pain in patients with tooth extraction.

Melzack.R.S, et.al., (2005) [J3] conducted an experimental study in Canada to evaluate the effectiveness of cryotherapy on dental pain reduction among 40 patients at OP dental clinic by using Visual Analogue Scale. The study concluded that the cryotherapy is a safe procedure for dental pain reduction.

Singh. H, Osbahr. D.C, (2004) [J11] have conducted prospective randomized study in USA to evaluate the efficiency of Cryotherapy on reduction of frequency and intensity of pain after both open and orthoscopic procedures on the shoulder among 70 post operative patients by using Visual Analogue Scale. The result indicated that Cryotherapy is an effective method for post operative pain control.

Keschan Schindl.K, et.al., (2004) [J9] have conducted a study to evaluate the effectiveness of continuous cryotherapy on pain reduction soon after Total Hip Arthroplasty (THA) among patients who had undergone THA for osteoarthritis. The pain scores measured on a visual analog scale. The results of this study supports the potential benefit of a cold compressive device for pain reduction during the postoperative recovery of patients undergoing THA.

Studies Related To Effectiveness Of Cryotherapy On Arterio Venous Fistula Puncture Related Pain

Khakha.P.B.S., et.al., (2008) [N7] conducted an experimental study in Newdelhi to assess the effectiveness of Cryotherapy on pain due to ArterioVenous fistula puncture. 60 patients undergoing hemodialysis by using ArterioVenous Fistula were taken as sample. Among them 30 were in experimental group and 30 were in control group. During the first visit the pain due to ArterioVenous Fistula puncture was assessed by Standardized Numerical Pain Assessment Scale in both the experimental and control group. During the second visit the cryotherapy was given to the experimental group with glove filled with ice cubes on the web between the thumb and index finger of the hand not having Arterio Venous Fistula (contra lateral arm). The control group were give routine intervention. The pain was assessed in

experimental group soon after the cryotherapy procedure. In the same time the pain was assessed in control group without cryotherapy by using Standardized Numerical Pain Assessment Scale. At the end of the study the pain score was reduced in the experimental group with the application of cryotherapy. The study concluded that cryotherapy was effective in reducing Arterio Venous Fistula puncture related pain

Unpublished Articles

A study was conducted by Ms.Bharathi in Coimbatore to evaluate the effectiveness of cryotherapy in reducing pain among patients with Rheumatoid Arthritis in a selected orth hospitals at Coimbatore by using quasi experimental pretest posttest design. 50 Rheumatoid patients were selected among them 25 were in control group and 25 were in experimental group. Level of pain was assessed by using Standardized Numerical Pain Assessment Scale. For experimental group cryotherapy was applied for 20 minutes, two sessions everyday. Data analyzed by using both descriptive and inferential statistics. Findings revealed that cryotherapy was effective on reducing pain among rheumatoid arthritis patients. (t -7.34 was significant at p0.05 level)

CONCEPTUAL FRAME WORK

MODIFIED KATHARINE KOLCABA'S THEORY OF COMFORT(1994)

Talbot bio stated(1995) that conceptual framework is a network of interrelated concepts that provide a structure that organize and describe the phenomenon of interest. Research studies are based on the theoretical or conceptual frame work that facilitate visualizing the problem and place the variables in a logical concept.

The present study is aimed at evaluating the effectiveness of cryotherapy on ArterioVenous Fistula puncture related pain among clients undergoing hemodialysis . The conceptual frame work of the present study is based on Katharine Kolcabas theory of comfort.

Kolcaba (1994) had defined comfort as the immediate state of being strengthened through having the human needs for relief, ease and transcendence addressed in four context of experiences. The theory components are,

Health Care Needs

Kolcabas defines health care needs identified are those by the patient/family in a particular practice setting.

This needs include physical, psychospiritual, social and environmental needs made apparent through monitoring verbal and non verbal reports, needs related to

pathophysiological parameters, needs for education and support, and need for financial counseling and intervention

In the present study health care need is reduction in Arterio Venous Fistula Puncture related pain which is assessed through standardized numerical pain assessment scale.

Comfort Measures

Comfort measures are defined as nursing intervention designed to address specific comfort needs of recipients, including physiological, social, financial, psychological, spiritual, environmental and physical interventions. In this present study cryoteraphy application in the web between the thumb and index finger of contra lateral arm is the nursing intervention designed to promote comfort.

Intervening Variables

Intervening variables are defined as interacting forces that influence recipient's perception of needs expressed by patient.

In the present study intervening variables are age, gender, educational status, duration of illness, and frequency of dialysis per month.

Comfort

Comfort is defined as the state experienced by recipient through comfort measures. It is the immediate and holistic experience being strengthened through having needs met for three types of comfort (relief, ease and transcendence). In this

study patient experiences reduction in pain caused by Arterio Venous Fistula Puncture by applying cryotherapy in the web between thumb and index finger of contra lateral arm.

Health Seeking Behavior

It represents the broad category of subsequent outcomes related to the pursuit of health as defined by the recipient in consultation with the nurse. In this present study cryotherapy was applied in order to reduce the Arterio Venous Fistula Puncture related pain among clients undergoing hemodialysis.

Institutional Integrity

The theory provides the following technical definition of institutional integrity. Corporations, communities, schools, hospitals, churches, reformatories and so on, that posses qualities or states of being complete, whole sound and upright, appealing honesty and sincere. The relationship between comfort and institutional integrity is recursive. In this hospital (SPT Hospital) setting patient with Arterio Venous Fistula Puncture related pain with recursive.

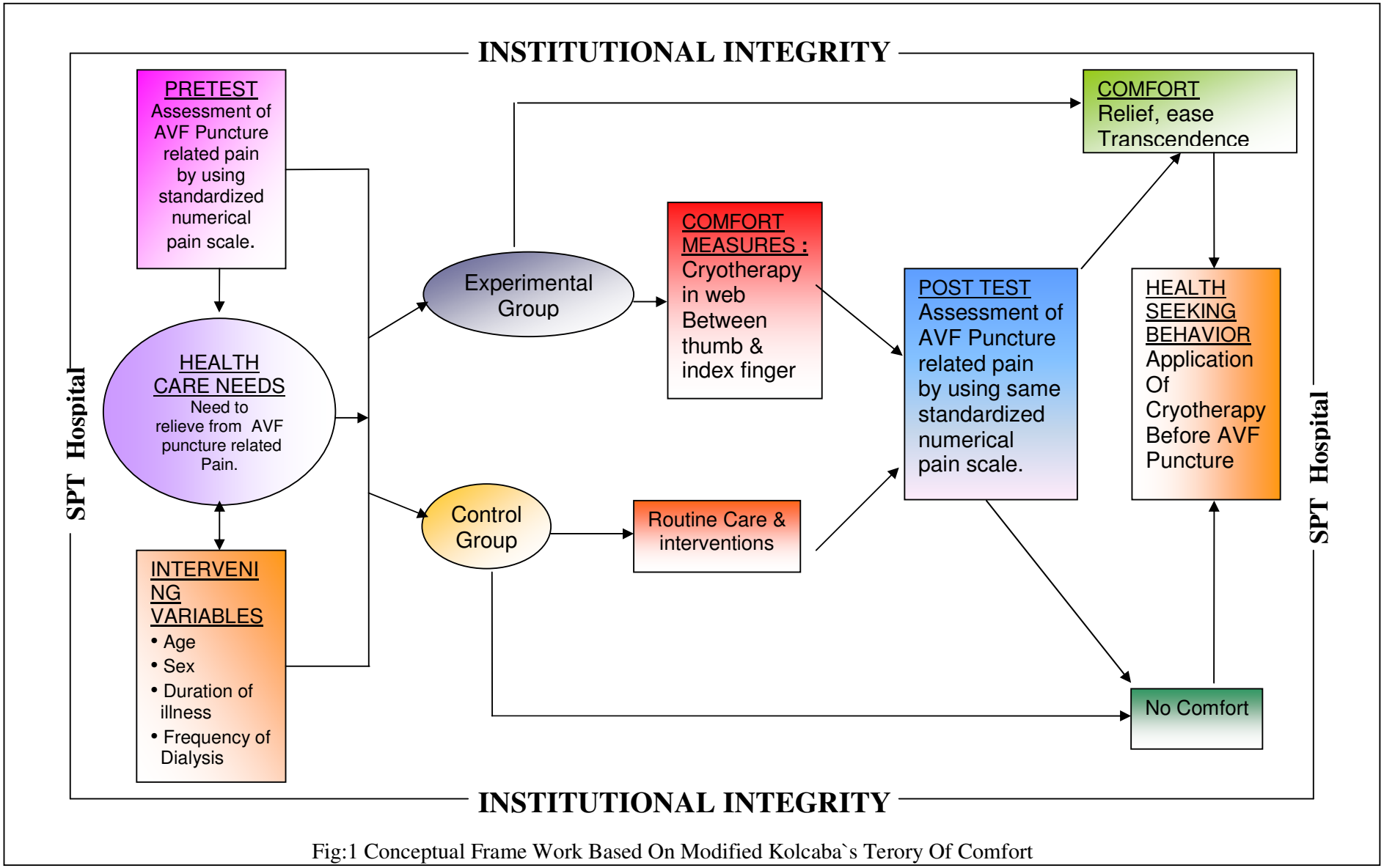


Fig:1 Conceptual Frame Work Based On Modified Kolcaba`s Terory Of Comfort

Methodology

CHAPTER-III

METHODOLOGY

Research methodology is one of the vital sections of the research, since the success of any research mostly depends upon the methodological issues that are followed in the execution of the research work. The role of the methodology consist of procedures and technique for conducting the study.

This chapter deals with the methodological approach adopted for the study. It include description of research approach, research design, setting of the study, population, sample, criteria for sample selection, sampling technique, development of the tool, scoring procedure, pilot study, data collection procedure, plan for data analysis and protection of human rights.

Research Approach

Quantitative approach was used for analyzing the effectiveness of cryotherapy on ArterioVenous Fistula puncture related pain among clients undergoing hemodialysis.

Research Design

Nancy Burns, Susan.k. Groove(2005), defined research design as a blue print for conducting the study that maximizes control over factor that could interfere with the validity of the findings. The research design guides the researcher in planning and implementing the study in a way that is most likely to achieve the intended goal.

According to Polit and Hungler (2004) “quasi experiment involve the manipulation of an independent variable that is, institution of an intervention. Quasi experiment however lacks either the randomization or control group features that characterize true experiments”.

Randomization was not adopted as it was not possible to have the entire listing of clients with Arterio Venous Fistula puncture. Hence this design was selected.

Quasi experimental pretest posttest design with control group was adapted without randomization. Assessment was made before and after the intervention (cryotherapy) with Numerical Pain Assessment Scale.

The diagrammatic representation of research design is as follows.

Group	Pre Test	Intervention	Post Test
Experimental	O_1	X	O_2
Control	O_3	*	O_4

O_2-O_1 =Effectiveness of cryotherapy.

Key

O_1 - Assessment of level of ArterioVenous Fistula Puncture Related Pain (Pre test) in experimental group.

O_2 - Assessment of level of Arterio Venous Fistula Puncture Related Pain (Post test) in experimental group.

X - Cryotherapy Intervention.

*	-	No Cryotherapy Intervention.
O_3	-	Assessment of level of ArterioVenous Fistula Puncture Related Pain (Pre test) in control group.
O_4	-	Assessment of level of ArterioVenous Fistula Puncture Related Pain (Post test) in control group.

Variables

Dependent Variable	-	Arterio Venous Fistula Puncture Related Pain
Independent Variable	-	Cryotherapy on web between the thumb and index finger of the hand, not having AV Fistula (Contra Lateral Arm).
Extraneous variables	-	Age, Sex, Educational status, Duration of illness, and Frequency of dialysis per month.

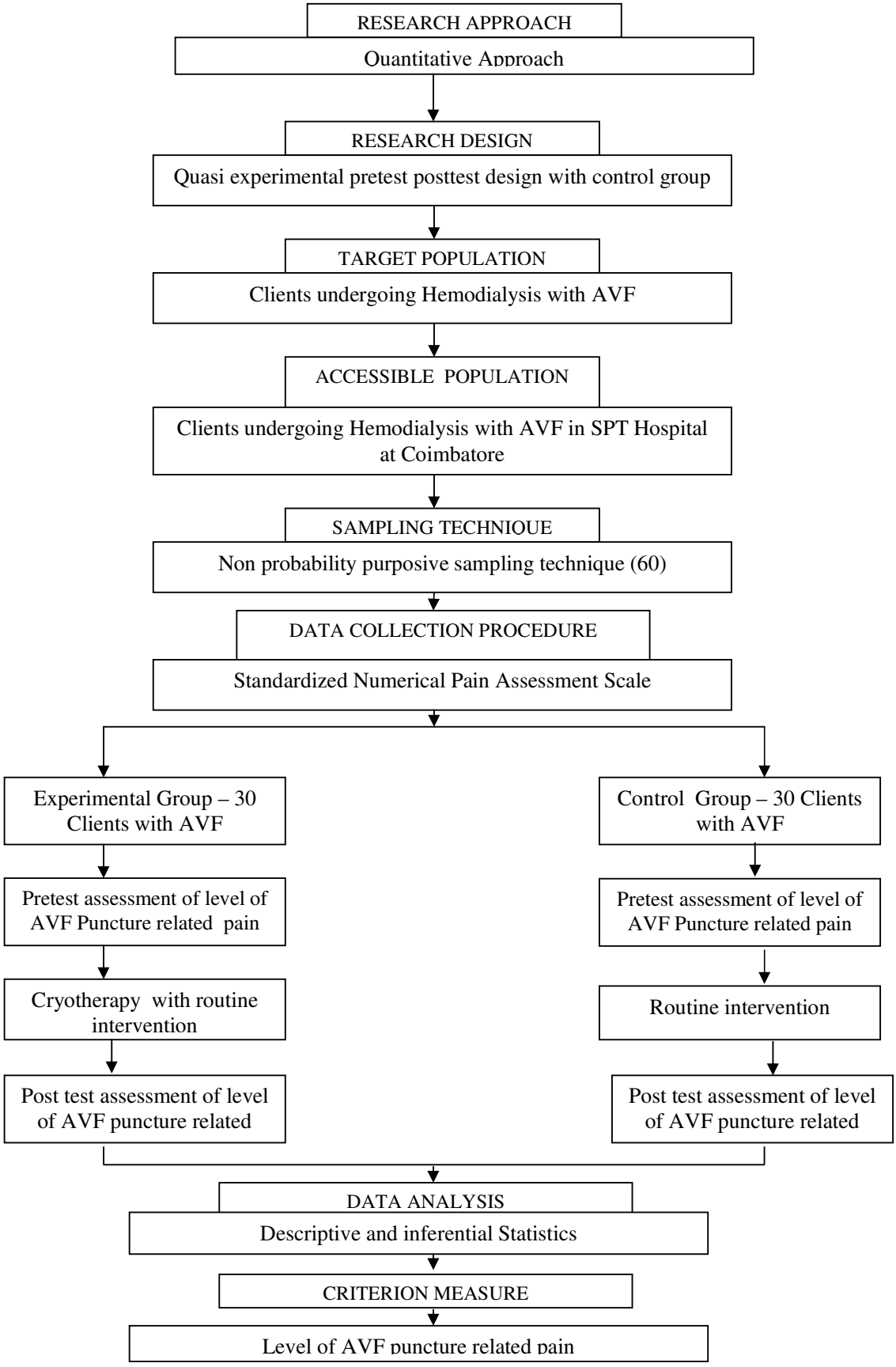


Fig:2 The Schematic Representation of Research Methodology

Setting Of The Study

Polit and Hungler (2004) stated that physical location and conditions in which data collection takes place in a study is the setting of the study. The study was conducted in SPT Hospital at Coimbatore. It is located at a distance of 12 kilo meters from Annai Meenakshi College of Nursing, Coimbatore. It is a multispeciality with kidney super speciality hospital. It is otherwise called as Coimbatore Kidney Foundation. It is a 50 bedded hospital which has a separate hemodialysis unit. It is a five bedded unit and three to four sittings of dialysis takes place everyday except on Sundays. So approximately 15 to 20 patients undergo dialysis everyday. The hospital is a five storied building and each floor has 10 rooms with all basic facilities. Approximately 2-3 patients get admitted everyday for the treatment of renal diseases. For the partial fulfillment of the requirement of The TamilNadu Dr. MGR Medical University, this SPT Hospital has been selected for the study.

Population

According to Polit and Hungler (2005), "A population is the entire aggregation of cases in which a researcher is interested". The target population is the aggregation of cases about which the researcher would like to make generalizations. An accessible population is the section of the target population to which the researcher has reasonable access.

The target population for this study was clients undergoing hemodialysis with ArterioVenous Fistula. The accessible population for this study includes clients undergoing hemodialysis with Arterio Venous Fistula in SPT Hospital at Coimbatore.

Sample

Polit and Hungler,(2005) stated that sample consists of a subset of population selected to participate in a research study. A non probability purposive sampling technique was adapted to select 60 samples for the present study. Among them 30 for experimental and 30 for control group were selected from the patients undergoing hemodialysis with ArterioVenous Fistula in SPT hospital at Coimbatore.

Criteria for sample selection

Inclusion criteria

- Clients more than 18 years of age.
- Clients who can understand Tamil and English.
- Clients who are willing to participate in the study.
- AV Fistula puncture through button hole technique.

Exclusion Criteria

- Clients having AV Graft, Venous catheter
- Clients having wound in the web between the thumb and the index finger of the contra lateral arm
- Clients having paralysis, Diabetic neuropathy.

Sampling Technique

According to Polit and Hungler (2005) sampling technique is the process of selecting a portion of the population to represent the entire population. The samples were selected for the study by adapting non probability purposive sampling technique which means selection of the most readily available persons as participants in a study. Samples were selected based on inclusion and exclusion criteria.

On the day 1 the demographic variables and the Standardized Numerical Pain Assessment Scale was administered through structured interview schedule for pretest assessment of AVF puncture related pain among hemodialysis patients. It took ten minutes for each sample on day 2 the cryotherapy was given for 12 minutes to the experimental group alone and posttest assessment of level of AVF puncture related pain among patients undergoing hemodialysis by using the same Standardized Numerical Pain Assessment Scale was done in both the groups.

Development Of The Instrument

Treece and Treece (1960) emphasized that the instrument selected in research should as far as possible be the vehicle that could best obtain data for drawing conclusion, pertinent to the study.

The standardized numerical pain assessment scale was used as an instrument to measure the level of ArterioVenous Fistula puncture related pain. The research instrument was developed in English after an extensive review of literature and experts opinion then translated in to Tamil.

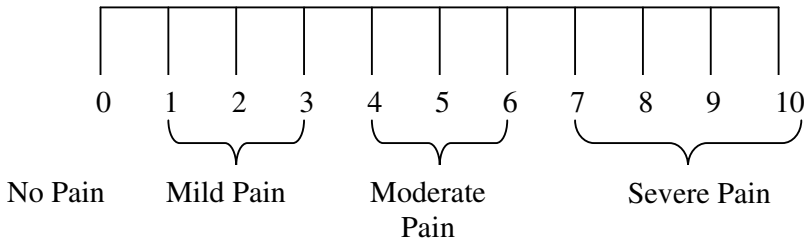
Description of The Instrument

The standardized numerical pain assessment scale was used to evaluate the effectiveness of cryotherapy on level of ArterioVenous Fistula puncture related pain.

It consisted of 2 parts.

Part I: Consists of demographic variables of clients undergoing hemodialysis with AV Fistula (Age, Sex, Educational Status, Duration of illness and Frequency of dialysis per month).

Part II: Consists of Numerical Pain Assessment Scale in range of 1-10, in which 0 – indicates no pain, 1-3 indicates mild pain, 4-6 indicates moderate pain, 7-10 indicates severe pain.



Scoring Procedure

Each statement is scored as follows,

Score	**Level of pain**
0	No pain
1 – 3	Mild pain
4 – 6	Moderate pain
7 – 10	Severe pain

Cryotherapy Technique Intervention

Cryotherapy is the cold application. Glove is filled with ice cubes, and this glove is applied over the web between the thumb and index finger of the hand not having the ArterioVenous Fistula (contra lateral arm). The ice application was started 10 minutes before the venipuncture and continued throughout the puncturing procedure.

Validity

According to Nancy Burns (1999) validity is the determination of the extent to which an instrument actually reflects the abstract construct being examined'. Judgment is based on prior research in the field and on the opinion of the expert.

The content validity was done by experts including 5 nursing experts in Medical Surgical Nursing, two medical experts in the field of Nephrology. All suggestions were considered and appropriate changes were made.

Pilot Study

Polit and Beck (2004) denote that pilot study is a small scale version or trial run done in preparation for the main study.

Pilot study was conducted in St.Mary's Hospital, Coimbatore to assess the feasibility of the study and to decide the statistical analysis. The permission for the study was obtained from the medical officer of the hospital. Six clients undergoing hemodialysis via ArterioVenous Fitula were selected for pilot study by using non

probability purposive sampling technique. The subjects of the pilot study possessed the same characteristics that of the sample of the final study. The pilot study finding was found to be feasible and statistical tests were appropriate for the main study.

Data Collection Procedure

A formal prior permission was obtained from the medical officer of SPT Hospital, Coimbatore. The study was conducted for period of six weeks. Since it was not possible to have the entire samples on one day, daily around 4 to 5 samples were selected based on the criteria for sample selection. The clients were assigned alternatively to the experimental group and control group. The clients were explained about the purpose of the study and written consent was obtained and assured of confidentiality of the data collected.

On the first day of sample selection the demographic data and pain level were assessed for 10 minutes. The experimental group received cryotherapy which was started ten minutes before the venipuncture and continued throughout the ArterioVenousFistula puncture on the second sitting of dialysis. An evaluation was carried out soon after the procedure for the experimental group and control group without cryotherapy.

Plan For Data Analysis

The demographic variables were analyzed by using descriptive measures (frequency and percentage). The level of pain was analyzed by using descriptive statistics(mean, standard deviation). The effectiveness of cryotherapy was analyzed by using paired ‘t’ test and independent ‘t’ test. Association between the level of Arterio

Venous Fistula puncture related pain among clients undergoing hemodialysis with their selected demographic variables was assessed by chi-square test.

Protection of Human Rights

The study was conducted after the approval of research committee in the college. The nature and the purpose of the study was explained to the medical officer of the SPT Hospital. The written consent was obtained from the study participants to gain full cooperation. Assurance was given to the study samples that the anonymity of each individual would be maintained strictly. The cryotherapy was suggested and taught to the control group after the post test to overcome the ethical issues.

Data Analysis and Interpretation

CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretations of the collected data from the samples in a selected hospital. Polit and Beck (2004) has denoted data analysis as the systematic organization, synthesis of research data and the testing of research hypotheses using those data.

The purpose of analysis was to reduce the data to an intelligible and interpretable form, so that the relation of the research problem can be studied and tested.

The collected data regarding effectiveness of Cryotherapy on level of AV Fistula puncture related pain among clients undergoing hemodialysis were organized and analyzed and interpreted as follows

Section I : Data on Demographic variables of clients with AV Fistula puncture related pain.

Section II : Data on level of AV Fistula Puncture related pain among clients undergoing hemodialysis

Section III : Data on effectiveness of Cryotherapy on level of AV Fistula Puncture related pain among clients undergoing hemodialysis.

Section IV : Data on Association between the level of AV Fistula puncture related pain among clients undergoing hemodialysis with their selected demographic variables.

SECTION I : DATA ON DEMOGRAPHIC VARIABLES OF CLIENTS WITH AV FISTULA PUNCTURE RELATED PAIN.

Table 1.1

Frequency and percentage distribution of demographic variables of clients with ArterioVenous Fistula puncture related pain in experimental and control group.

N = 60

S. No	Demographic Variables	Experimental Group		Control Group		Total	
		n	%	n	%	N	%
1	Age in years						
	a) 18 – 27	3	10	1	3.3	4	6.6
	b) 28 – 37	5	16.7	9	30	14	23.3
	c) 38 – 47	9	30	7	23.3	16	26.7
	d) 48 -57	7	23.3	9	30	16	26.7
	e) > 57	6	20	4	13.3	10	16.7
2.	Sex						
	a) Male	21	70	21	70	42	70
	b)Female	9	30	9	30	18	30
3.	Educational Status						
	a) Illiterate	2	6.7	6	20	8	13.3
	b) Primary Education	12	40	8	26.7	20	33.3
	c) Secondary Education	12	40	12	40	24	40
	d)Higher Secondary Education	1	3.3	3	10	4	6.7
	e) Graduate	3	10	1	.3	4	6.7

[Contd…]…

S. No	Demographic Variables	Experimental Group		Control Group		Total	
		n	%	n	%	N	%
4.	Duration of Illness						
	a) < 1 Year	9	30	12	40	21	35
	b) 2 – 5 Year	21	70	18	60	39	65
	c) > 5 Years	0	0	0	0	0	0
5.	Frequency of dialysis per month						
	a) <5 times	0	0	1	3.3	1	1.7
	b) 6 – 10 times	13	43.3	14	46.7	27	45
	c) 11- 15 times	17	56.7	15	50	32	53.3
	d) > 16 times	0	0	0	0	0	0

Table 1.1 shows that out of 30 subjects in experimental group 3(10%) belongs to the age group between 18- 27 years, 5(16.7%) belongs to the age group between 28 -37 years, 9(30%) belongs to the age group between 38-47 years, 7(23.3%) belongs to the age group between 48-57 years and 6(20%) belongs to the age group of 57 years. Out of 60 subjects in control group 1(3.33%) belongs to the age group between 18-27 years 9(30%) belongs to the age group between 28-37 years, 7(23.33%) belongs to the age group between 38-47 years, 9(30%) belongs to the age group between 48-57 years, and 4(13.33%) belongs to the age group of 57 years and above.

Regarding sex in experimental group majority 21(70%) were males and 9(30%) were females. In control group, 21(70%) were males and 9(30%) were females.

Regarding the educational status, in experimental group 2(6.7%) were illiterate, 12(40%) had primary education, 12(40%) had secondary education, 1(3.3%) had higher secondary education, 3(10%) were graduates. In control group 6(20%) were illiterate, 8(26.7%) had primary education, 12(40%) had secondary education, 3(10%) had higher secondary education, and 1(3.3%) was graduate.

Regarding the duration of illness, in experimental group 9(30%) were having less than 1year of duration of illness,21(70%) were having 2-5 years of duration of illness. In control group 12(40%) were having less than 1 year of duration of illness and 18(60%) were having 2 – 5 years of duration of illness.

Regarding Frequency of dialysis, in experimental group 13(43.3%) undergoes 6-10 times dialysis per month, 17(56.7%) undergoes 11-15 times dialysis per month. In control group 1(3.3%) undergoes less than 5 times dialysis per month, 14(46.7%) undergoes 6-10 times dialysis per month, and 15(50%) undergoes 11-15 times dialysis per month.

It is inferred that most of the clients with ArterioVenous Fistula puncture related pain were between 38- 57 years, male sex, undergone secondary education, having duration of illness between 2 – 5 years and undergoes 11-15 time dialysis per month.

SECTION II : DATA ON LEVEL OF AV FISTULA PUNCTURE RELATED PAIN AMONG CLIENTS UNDERGOING HEMODIALYSIS

Table 2.1

Frequency and percentage distribution of level of Arteriovenous Fistula Puncture related pain among clients undergoing hemodialysis in experimental group.

n = 30

S. No	Variables	Pre Test		Post Test	
		n	%	n	%
1.	Level of Pain				
	a). No Pain	0	0	0	0
	b). Mild Pain	0	0	20	66.7
	c). Moderate Pain	20	66.7	10	33.3
	d). Severe Pain	10	33.3	0	0

Table 2.1 reveals that in experimental group, in pre test 20 (66.7%) reported moderate pain and 10 (33.3%) reported severe pain. After intervention of Cryotherapy in post test 20 (66.7%) reported mild pain and 10 (33.3%) reported moderate pain.

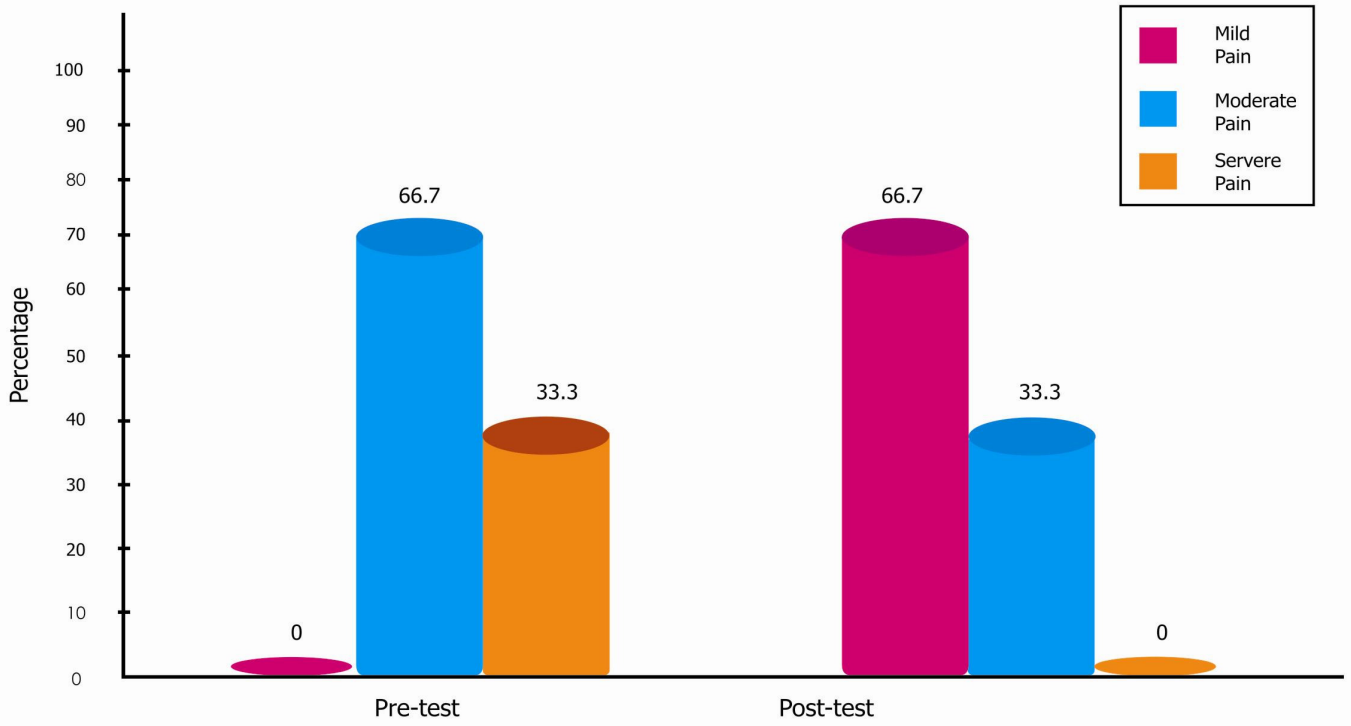


Figure 3 : Level of Arteriovenous Fistula Puncture related Pain among Clients Undergoing Hemodialysis in Experimental Group

Table 2.2

Frequency and percentage distribution of level of Arteriovenous Fistula Puncture related pain among clients undergoing hemodialysis in control group.

n = 30

S. No	Variables	Pre Test		Post Test	
		n	%	n	%
1.	Level of Pain				
	a). No Pain	0	0	0	0
	b). Mild Pain	0	0	0	0
	c). Moderate Pain	21	70	21	70
	d). Severe Pain	9	30	9	30

Table 2.2 reveals that in control group, in pre test 21(70%) reported moderate pain and 9(30%) reported severe pain. without intervention of Cryotherapy in post test 21(70%) reported moderate pain and 9 (30%) reported severe pain.

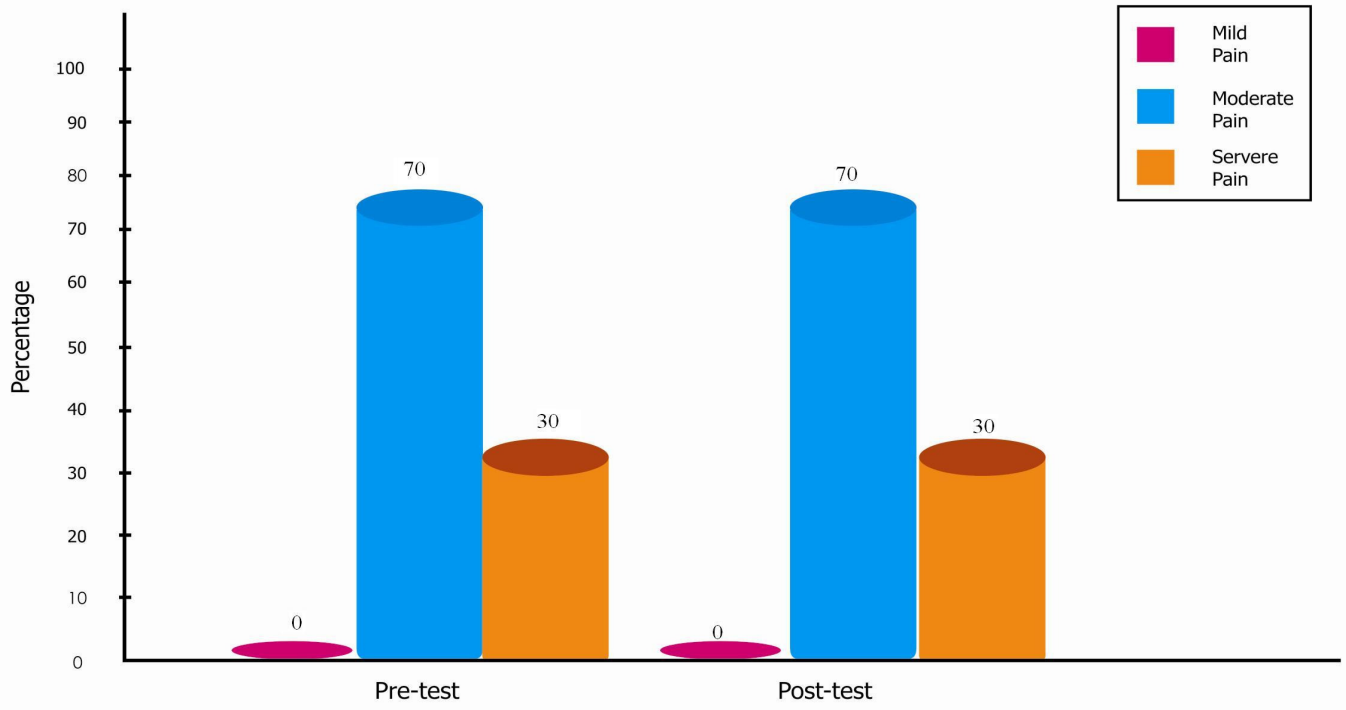


Figure 3.1 : Level of Arteriovenous Fistula Puncture related Pain among Clients Undergoing Hemodialysis in Control Group

SECTION III : DATA ON EFFECTIVENESS OF CRYOTHERAPY ON LEVEL OF AV FISTULA PUNCTURE RELATED PAIN AMONG CLIENTS UNDERGOING HEMODIALYSIS.

Table 3.1

Mean, Standard deviation and t - value of level of Arteriovenous Fistula Puncture related pain among clients undergoing hemodialysis in experimental group

n=30

S. No	Group	Mean	Standard Deviation	Mean Difference	t value
1	Experimental Group :				
	Pre test	5.5	1.08		
				1.50	16.1***
	Post Test	4.0	1.41		

***significant at p<0.001 level.

Table 3.1 reveals that in experimental group the pretest mean was 5.5 and posttest mean was 4.0. The pretest standard deviation was 1.08 and the posttest standard deviation was 1.41. The mean difference was 1.50 and the obtained t-value was 16.1 which is significant at 0.001 level. Hence, the stated hypothesis was accepted.

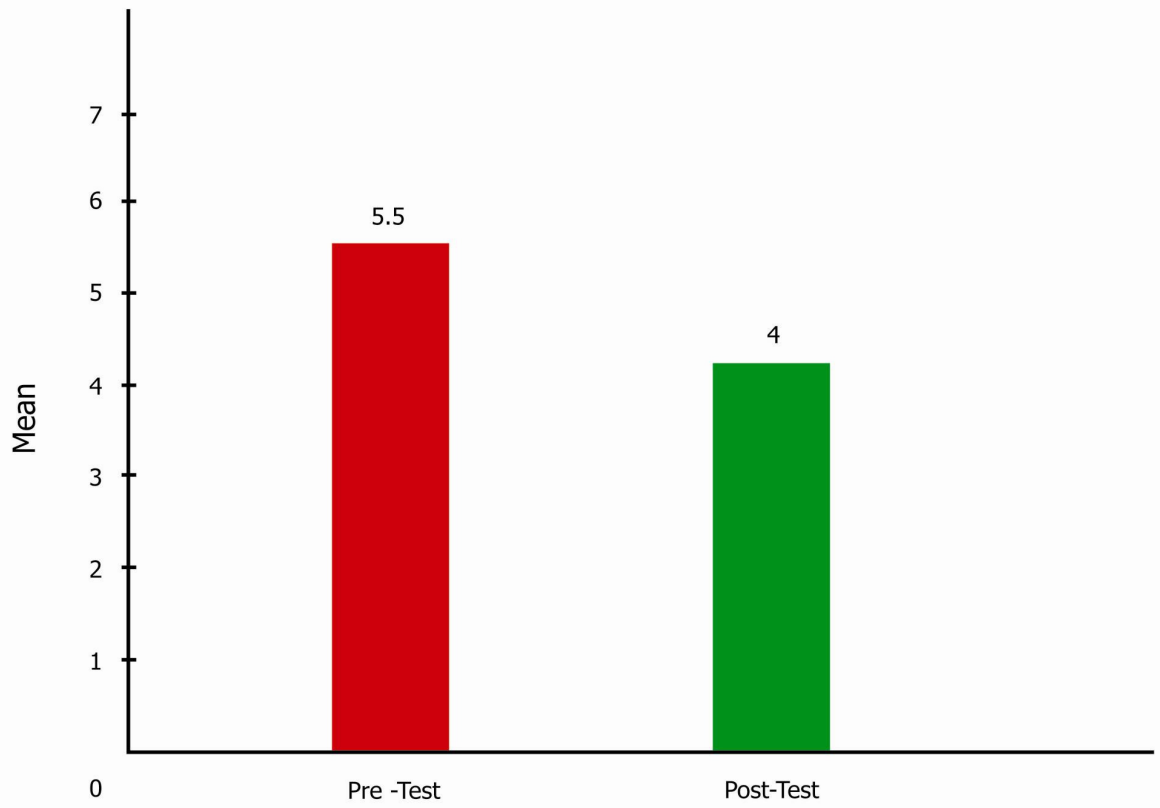


Figure 4 : Mean value of Arteriovenous Fistula Puncture related Pain in Experimental Group

Table 3.2

Mean, Standard deviation and t - value of level of Arteriovenous Fistula Puncture related pain among clients undergoing hemodialysis in control group n=30

S. No	Group	Mean	Standard Deviation	Mean Difference	t value
2.	Control Group :				
	Pre Test	5.96	0.91		
				0.06	1.26^{NS}
	Post Test	5.9	0.94		

NS-Not Significant

In control group the pretest mean was 5.96 and posttest mean was 5.9. The pretest standard deviation was 0.91 and the posttest standard deviation was 0.90. The mean difference was 0.06 and the obtained t-value was 1.26 which is not significant. Hence the stated hypothesis was accepted.

It is inferred that cryotherapy was effective in reducing the AVF puncture related pain among clients undergoing hemodialysis.

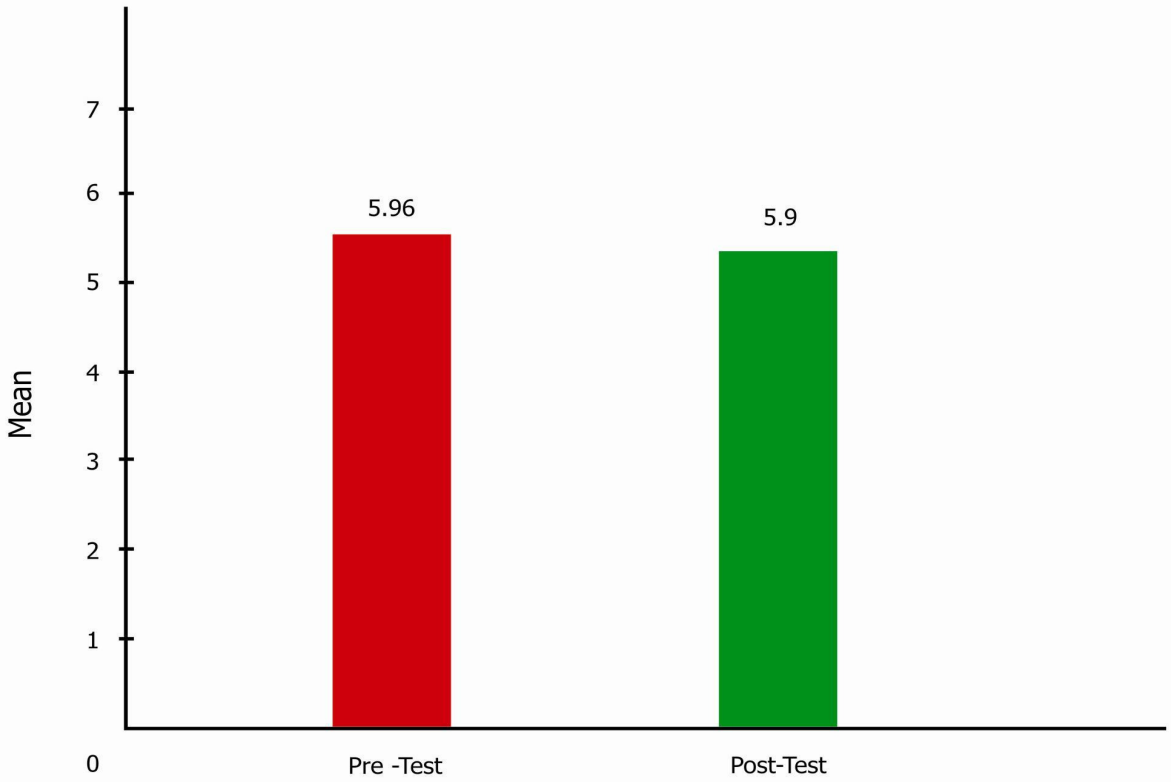


Figure 4.1 : Mean value of Arteriovenous Fistula Puncture related Pain in Control Group

Table 3.3

Mean, Standard Deviation, Mean Difference and t - value of post test score of level of Arteriovenous Fistula Puncture related pain among clients undergoing Hemodialysis in Experimental and control group.

n=30

S. No	Group	Mean	Standard Deviation	Mean Difference	t value
2.	Experimental Group :				
	Post Test	4	1.41	1.50	16.1
	Control Group :				
	Post Test	5.9	0.94	0.06	1.26

Table 3.3 reveals that post test mean score of AVF puncture related pain in Experimental Group was 4 which is lower then the post test mean score of 5.9 in control group. It was inferred that cryotherapy was effective in reducing AVF puncture related pain among clients undergoing hemodialysis.

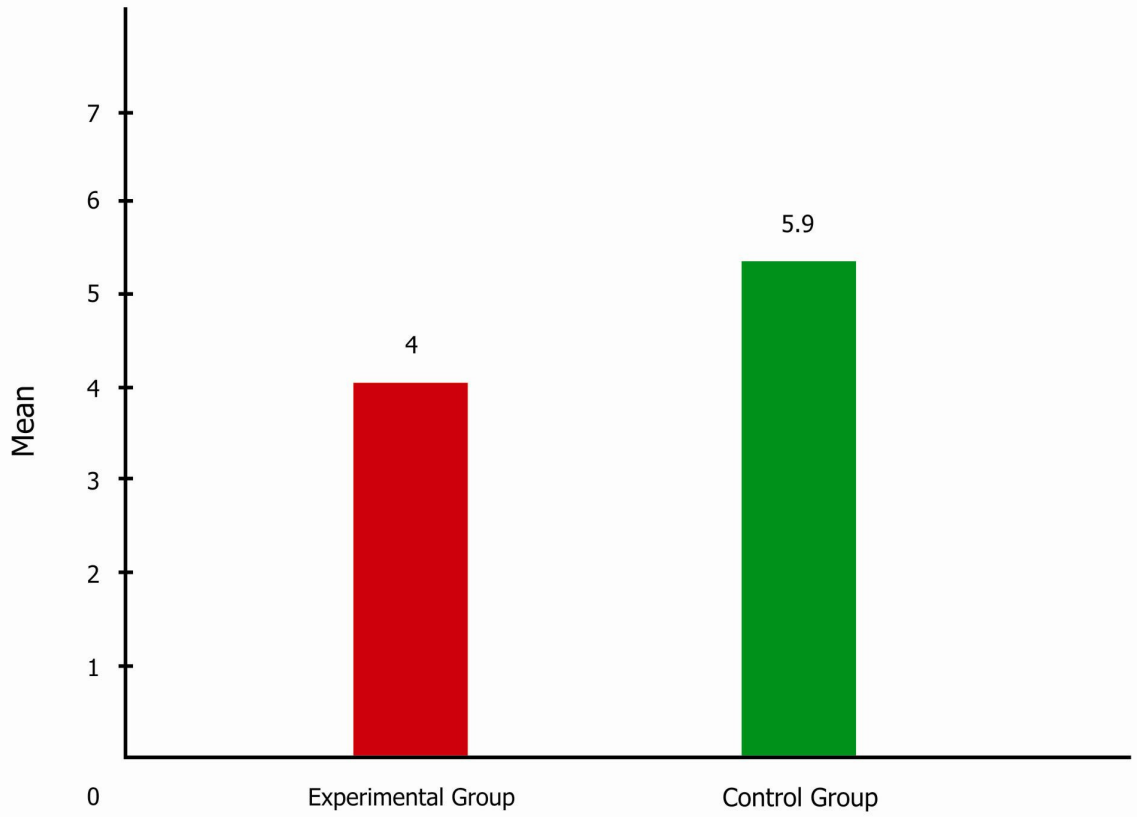


Figure 5 : Post-test Mean Value of Level of Acteriovenous Fistual Puncute related Pain in Experimental and Control Group

SECTION IV : DATA ON ASSOCIATION BETWEEN THE LEVEL OF AV FISTULA PUNCTURE RELATED PAIN AMONG CLIENTS UNDERGOING HEMODIALYSIS WITH THEIR SELECTED DEMOGRAPHIC VARIABLES.

Table 4.1

Frequency, percentage distribution and χ^2 value on level of ARTERIO VENOUS FISTULA puncture related pain among clients undergoing hemodialysis with their selected demographic variables.

N= 60

S. No	Demographic Variables	No Pain		Mild Pain		Moderate Pain		Severe Pain		χ^2_{value}
		n	%	n	%	n	%	n	%	
1.	Age in years									
	a) 18 – 27	0	0	0	0	3	5	1	1.7	
	b) 28 – 37	0	0	0	0	10	16.7	4	6.7	12.49*
	c) 38 – 47	0	0	0	0	9	15	7	11.7	df= 4
	d) 48 – 57	0	0	0	0	11	18.3	5	8.3	
	e) > 57	0	0	0	0	8	13.3	2	3.3	
2.	Sex									
	a) Male	0	0	0	0	33	55	9	15	8.23*
	b)Female	0	0	0	0	8	13.3	10	16.7	df=1
3.	Educational Status									
	a) Illiterate	0	0	0	0	5	8.33	3	5	
	b) Primary	0	0	0	0	12	20	8	13.33	

S. No	Demographic Variables	No Pain		Mild Pain		Moderate Pain		Severe Pain		χ^2 Value
		n	%	n	%	n	%	n	%	
	c) Secondary	0	0	0	0	20	33.3	4	6.6	
	d) Higher Secondary	0	0	0	0	2	3.3	2	3.3	4.45^{NS}
	e) Graduate	0	0	0	0	2	3.3	2	3.3	df=4.0
4.	Duration of Illness									
	a) < 1 Year	0	0	0	0	6	10	15	25	
	b) 2 – 5 Year	0	0	0	0	35	58.3	4	6.7	23.58*
	c) > 5 Years	0	0	0	0	0	0	0	0	df=2
5.	Frequency of dialysis per month									
	a) <5 times	0	0	0	0	1	1.7	0	0	10.66*
	b) 6 – 10 times	0	0	0	0	24	40	3	5	df=3
	c) 11- 15 times	0	0	0	0	16	26.7	16	26.7	
	d) > 15 times	0	0	0	0	0	0	0	0	

*- significant at 0.05 Level, NS – Not Significant

Table 4.1 envisages the substantive summary of chi-square analysis, which was used to bring out the association between the pain and demographic variables of the groups.

With regard to age, among 18-27 years 3(5%) had moderate pain and 1(1.7%) had severe pain. Among 28-37 years 10(16.7%) had moderate pain, 4(6.7%) had severe pain. Among 38-47 years 9(15%) had moderate pain and 7(11.7%) had severe pain. Among 48-57 years 11(18.3%) had moderate pain and 5(8.3%) had severe pain. Among more than 57 years 8(13.3%) had moderate pain and 2(3.3%) had severe pain. The obtained χ^2 value was 12.49 which is significant at 0.05 level and thus the stated hypothesis is accepted. So it is inferred that there is significant association between age and AVF puncture related of pain among clients undergoing hemodialysis.

With regard to sex, among males 33(55%) had moderate pain, 9(15%) had severe pain. Among females 8(13.3%) had moderate pain and 10(16.7%) had severe pain. The obtained χ^2 value was 8.23 which is significant at 0.05 level and thus the stated hypothesis is accepted. So it is inferred that there is significant association between sex and AVF puncture related of pain among clients undergoing hemodialysis.

With regard to educational status, among illiterate 5(8.33%) had moderate pain, and 3(5%) had severe pain. Among primary educational status 12(20%) had moderate pain, and 8(13.3%) had severe pain. Among secondary educational status 20(33.33%) had moderate pain and 4(6.60%) had severe pain. Among higher secondary educational status 2(3.33%) had moderate pain and 2(3.33%) had severe pain. Among graduate 2(3.33%) had moderate pain and 2(3.33%) had severe pain. The obtained χ^2 value was 4.45 which is not significant at 0.05 level and thus the stated hypothesis is rejected. So it is inferred that there is no significant association

between the educational status and AVF puncture related of pain among clients undergoing hemodialysis.

With regard to duration of illness, among less than 1 year of duration of illness 6(10%) had moderate pain and 15(25%) had severe pain. Among 2-5 years of duration of illness 35(58.3%) had moderate pain and 4(6.7%) had severe pain. The obtained χ^2 value was 23.58 which was significant at 0.05 level and thus stated hypotheses was accepted. It is inferred that there is significant association between the duration of illness and AVF puncture related of pain among clients undergoing hemodialysis.

With regard to frequency of dialysis per month, among less than 5 times 1(1.7%) had moderate pain. Among 6-10 times per month 24(40%) had moderate pain and3(5%) had severe pain. Among 11-15 times per month 16(26.7%) had moderate pain and 16(26.75) had severe pain. The obtained χ^2 value was 10.66 which was significant at 0.05 level and thus stated hypotheses was accepted. It is inferred that there is significant association between the frequency of dialysis per month and AVF puncture related of pain among clients undergoing hemodialysis.

Discussion

CHAPTER - V

DISCUSSION

The basic aim of the current study was to evaluate the effectiveness of cryotherapy on AVF puncture related pain among clients undergoing hemodialysis. The study was conducted by using Quasi-experimental pretest posttest with control group design. SPT Kidney superspeciality hospital and research institute at Coimbatore was selected for conducting the study. The sample size was 60,among which 30 in experimental group and 30 in control group were selected.

By using structured interview schedule Standardized Numerical Pain Assessment Scale was administered to assess the severity of pain among clients undergoing hemodialysis with AVF.

The responses were analyzed through descriptive statistics (mean, frequency, percentage) and inferential statistics (t test and Chi-square). Discussion on the findings was arranged based on the objective of the study.

The objective of the present study was to evaluate the effectiveness cryotherapy on AVF puncture related pain among clients undergoing hemodialysis. In experimental group on the second day after the intervention of cryotherapy 20(66.7%) had mild pain, 10(33.3%) had moderate pain.

In control group on the second day without intervention of cryotherapy 21(70%) had moderate pain and 9(30%) had severe pain.

The study findings revealed that , in experimental group the pretest mean was 5.5 and posttest mean was 4.00. The mean difference between pretest and posttest was 1.50. The standard deviation value of pretest was 1.08 and the posttest standard deviation value was 1.41. The 't' value within the group was 16.1 which is highly significant at $p<0.001$ level.

In control group the pretest mean was 5.96 and the posttest mean was 5.9. The mean difference between pretest and posttest was 0.06. The standard deviation value of pretest was 0.91 and the standard deviation value of posttest was 0.94. The 't' value within the group was 1.26 which is not significant at $p<0.001$ level. Hence the stated hypothesis was accepted.

With regard to association of AVF puncture related pain with their selected demographic variables only the educational status had no significant association with the AVF puncture related pain.

The study was supported by Khakha.P.B.S., et.al., (2008) conducted an experimental study in NewDelhi to assess the effectiveness of Cryotherapy on pain due to ArterioVenous fistula puncture. 60 patients undergoing hemodialysis by using ArterioVenous Fistula were taken as sample. Among them 30 were in experimental group and 30 were in control group.

The AV fistula puncture pain scores on days 1 and 2 of hemodialysis within the experimental group were found lo be significantly reduced ($P = 0.001$) from an average of 3.8 on day 1 of hemodialysis (when the patient received routine care) to

0.7 on day 2 of hemodialysis (when cryotherapy was given). There was a significant reduction (P = 0.001) in the subjective AV fistula puncture pain scores (1-2.5) on day 2 of hemodialysis, compared to the scores (2-7) on day 1 of hemodialysis. AV fistula puncture pain scores on days 1 and 2 of hemodialysis within the control group were found to be similar (P = 0.23) on two consecutive days of hemodialysis (when patient received only routine care). There also was no significant difference (P = 0.89) in subjective AV fistula puncture pain scores on day 2 of hemodialysis as compared to the scores on day I of hemodialysis.

This present study shows that cryotherapy was effective for the patients undergoing hemodialysis with AVF. The investigator experienced in SPT hospitals and research institute, samples who were undergone hemodialysis with AVF was able to overcome the pain and there was reductions in the severity of AVF puncture related pain. So the investigator suggests that every client who undergoes hemodialysis with AVF can practice cryotherapy.

Summary and Recommendations

CHAPTER-VI

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter deals with summary, conclusion, limitations and recommendations of the study. Further it includes implications for nursing practice, nursing education, nursing administration and nursing research.

Summary of the study

The present study was to evaluate the effectiveness of cryotherapy on AVF puncture related pain among clients undergoing hemodialysis in a selected hospital at Coimbatore.

Objective of the study was to evaluate the effectiveness of cryotherapy on AVF puncture related pain among clients undergoing hemodialysis**.**

A quasi - experimental pretest and posttest with control group design was chosen for this study without randomization. The samples were selected for this study by adopting purposive sampling technique. The sample selected for the present study was 60 among which 30 for experimental and 30 for control group. The data was collected by structured interview questionnaire, and Standardized Numerical Pain Assessment Scale was administered to assess the level of AVF puncture related pain among clients undergoing hemodialysis.

The tool was used to collect the data, which consisted of two parts. Part I consisted of Demographic variables. Part II consisted of Standardized Numerical Pain Assessment Scale to assess the level of pain.

The contents of the questionnaire were checked and evaluated by seven experts. The experts were two doctors specialized in Nephrology and General medicine; five nursing experts specialized in Medical surgical nursing. Data was collected for 6 weeks in SPT hospitals and research institute at Coimbatore.

The data collected were analyzed through descriptive statistics (frequency and percentage) and inferential statistics ('t' test and Chi- square) to test the hypothesis.

Major Findings of the Study

Major study findings include

- Among clients with AVF puncture pain, most of them were between 38-57 years, female sex, have secondary education, had 2-5 years of duration of illness, and undergoes 11-15times dialysis per month.

- Regarding the level of AVF puncture pain in experimental and control group most of them reported moderate and severe pain on day 1 in both groups, on day 2 most of them reported mild and moderate pain in experimental group and there were no measurable difference in control group.

- With regard to effectiveness of cryotherapy on AVF puncture pain. The obtained 't' value for in control group was 1.26 which is not significant at

0.001 level, and in experimental group the 't' value was 16.1 that was highly significant at 0.001 level.

- With regard to the association between the level of pain with their selected demographic variables such as age, sex, educational status, duration of illness, frequency of dialysis per month, there were significant association found with age, sex duration of illness and frequency of dialysis per month. There was no significant association between the level of AVF puncture pain and educational status.

Conclusion

The main conclusion from this present study is that most of the hemodialysis patients with AVF puncture pain in experimental group had moderate and severe pain in pretest and mild and moderate pain in post test. This shows the imperative need to understand the purpose of cryotherapy technique regarding reduction of AVF puncture related pain among clients undergoing hemodialysis and it will improve the quality of life which includes the stability in physiological, psychological vocational and lifestyle aspects.

Implication of the Study

According to Tolsma, (1995) the section of the research report that focuses on nursing implication usually includes specific suggestions for nursing practice, nursing education, nursing administration and nursing research.

Nursing Practice

The findings of the study clearly point out that cryotherapy intervention is effective in reduction of AVF puncture related pain among clients undergoing hemodialysis.

The reduction of AVF puncture related pain among clients undergoing hemodialysis has an important role to play in enabling effectiveness of cryotherapy intervention as an independent nursing intervention. This can be facilitated by motivating the nurses to:

- Learn accurate assessment of level of AVF puncture related pain with Standardized Numerical Pain Assessment Scale.
- Develop sensitivity to the effects of cryotherapy on reduction of pain among clients undergoing hemodialysis.
- Understand the importance of cryotherapy technique intervention as an adjunct to the Pharmacological therapy.
- Encourage peer use of cryotherapy intervention as a form of diversion among the clients undergoing hemodialysis.
- Encourage the use of cryotherapy intervention in reduction of AVF puncture related pain and to minimize the requirement of pharmacological management.

Nursing Education

Health personnel may separate the theory and practice while treating the clients with AVF puncture related pain and tend to reduce the level of pain which can be beneficial for the patients. So nursing educators should motivate students to

- Ensure that they learn the assessment of pain and effectiveness of cryotherapy intervention in reduction of AVF puncture related pain as an independent nursing intervention.
- Provide adequate clinical exposure to students, where cryotherapy is used in Reducing AVF puncture related pain.
- Arrange for participation in demonstrating cryotherapy techniques and by using audio visual aids, group conference and bed side clinics.
- Make available literatures related to cryotherapy techniques in reduction of AVF puncture related pain in the library, for student's reference.

Nursing Administration

- Collaborate with hospital authorities in formulating policies to employ the specially qualified nurses in Nephrology ward and periodically supervise their application of cryotherapy intervention.
- Conduct In-service education programme on cryotherapy intervention and its application in various fields.
- Provide opportunity for nurses to attend training programme on cryotherapy techniques while handling the patients undergoing hemodialysis through AVF.

Nursing Research

- Encourage further research studies on the effectiveness of cryotherapy intervention in reduction of AVF puncture related pain among clients undergoing hemodialysis.

- As it is evident from the review of literature more research needs to be conducted on effectiveness of cryotherapy intervention along with other routine procedure, in reduction of AVF puncture related pain.
- Disseminate the findings through the conferences, seminars publication in professional, national and international journals and World wide web.

Limitations

- The study was done only for 30 samples with no randomization, so generalization is possible only for the selected samples.
- The study covered a population of clients undergoing hemodialysis only with AVF and others were excluded.

Recommendations

- The study can be replicated with large sample size.
- The study can be conducted on patients with pain due to other types of cannulations.
- The intervention cryotherapy and its good effects can be taught to all the care givers include family members.
- A study can be conducted to assess the attitude and practice among nurses posted in hemodialysis unit.
- Comparative study can be conducted between the cryotherapy with other therapies.

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APPENDIX - A

Ref. No.

Date : .....

Requisition for Content validity

From

Ms.Sivagami.R
II year M.Sc(N)
Annai Meenakshi College of Nursing,
Coimbatore – 21.

Through
The Principal,
Annai Meenakshi College of Nursing,
Coimbatore – 21.

PRINCIPAL
Annai Meenakshi College of Nursing
COIMBATORE-641 021.

To
PROF. RAJI K,
VICE PRINCIPAL,
K.G. COLLEGE OF NURSING

Respected Sir/Madam,

Sub: Requisition for expert opinion and suggestion for content validity of the tools – Reg.

I am a student of M.Sc., Nursing II year of Annai Meenakshi College of Nursing, Coimbatore, affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai. As a partial fulfillment of the M.Sc., Nursing programme. I am conducting a study to assess the "Effectiveness Of Cryotherapy on Arteriovenous Fistula Puncture Related Pain Among clients Undergoing Hemodialysis in a Selected Hospital at Coimbatore". I am hereby enclosing the following:

1. Statement and objectives of the study
2. Hypothesis
3. Methodology
4. Cryotherapy
5. Tool
6. Content Validity certificate.

Herewith I am submitting these for content validity and for expert opinion and possible suggestion. I will be grateful to you and request you to return the same to the undersigned at the earliest possible.

Thanking you,

Yours faithfully,

Place: Coimbatore
Date: 8-5-10

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Ref. No.

Date : .....

APPENDIX - B

Certificate of Validation

This is to certify that the tools developed by **Ms.Sivagami.R** M.Sc (N) Final year student of Annai Meenakshi College of Nursing, Coimbatosre, Tamil Nadu (Affiliated to The Tamil Nadu Dr.M.G.R. Medical University, Chennai) is validated by undersigned and can proceed with this tool and conduct the main study for dissertation entitled a study to assess the "Effectiveness Of Cryotherapy on Arteriovenous Fistula Puncture Related Pain Among clients Undergoing Hemodialysis in A Selected Hospital at Coimbatore".

Place: Coimbatore

Date: 22/5/10

Signature 22/5/10

Prof. R.A.S.I. Ki, Vice principal
Name and Designation

APPENDIX-C

Name List Of Experts Who Validated The Tool

- Dr .S.P.THIAGARAJAN M.D., D.M.,
  SPT Hospitals,
  Coimbatore.

- PROF.DR.S.VEERAKESARI.M.D.,
  Consultant Physician,
  Shri Meenakshi Hospital,
  Coimbatore.

- MRS.RAJI.K.M.SC.,(N),
  Vice Principal,
  K.G.College of Nursing,
  Coimbatore.

- Mr. N.MEENAKSHI SUNDRAM,M,SC.,(N),MBA.,
  Associate Professor
  R.V.S.College of Nursing,
  Coimbatore.

- Mr.RAJA. M,Sc.,(N),
  Profeeser,
  KMCH College of Nursing.
  Coimbatore.

- Mr.BALASUBRAMANI. M.Sc.,(N),
  Professor,
  KMCH College of Nursing.
  Coimbatore.

- Mrs.BEENA, M,Sc.,(N),
  Professor,
  PSG. College of Nursing.
  Coimbatore.

எஸ்பிடி மருத்துவமனை
SPT HOSPITALS
Kidney Super-speciality Research Center
Family Health Multi-speciality Center

Coimbatore Kidney Foundation

Dr SP Thiagarajan MD DM
Chairman & Chief Nephrologist
HOD & Prof. of Nephrology (Retd.)
Coimbatore Medical College & Hospital
drspthiagu@gmail.com

APPENDIX - E

09.07.2010

This is to state that Mrs. Sivagami.R, M.Sc (Nursing), IInd year from Annai Meenakshi College of Nursing, Coimbatore has been given permission to conduct the study on "Effectiveness Of Cryotherapy On ArterioVenous Fistula Puncture Related Pain Among Clients Undergoing Haemodialysis" at SPT Hospitals, Coimbatore from 09.07.2010 to 09.08.2010.

(Dr. SP. Thiagarajan M.D., D.M.,)

Dr SP Thiagarajan MD DM
Chairman & Chief Nephrologist
Regd No 24563
எஸ்பிடி மருத்துவமனை
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Tel 0422 2232525 / 4380543

APPENDIX-F

Structured Interview Questionnaire (English).

CONSENT FORM

Hereby I, _____ declare that Mrs.Sivagami.R, M.Sc[N] Second Year studying in Annai Meenakshi College of Nursing at Coimbatore is conducting a research study to assess the effectiveness of cryotherapy in reducing Arterio Venous Fistula puncture related pain and I came to know from her explanation that there is no side effect in this treatment. So, I accept to undergo this cryotherapy treatment.

Yours Truly,

Place :

Date :

PART - I

DEMOGRAPHIC VARIABLES

Instruction: Please (✓) in appropriate column

Sample No. ( )

1. Age

a). 18 - 27 ( )

b). 28 - 37 ( )

c). 38 - 47 ( )

d). 48 - 57 ( )

e). > 57 ( )

2. Sex

a). Male ( )

b). Female ( )

3. Educational Status

a). Illiterate ( )

b). Primary ( )

c). Secondary ( )

d). Higher Secondary ( )

e). Graduate ( )

4. Duration of Illness

a). < 1 Year ( )

b). 2 - 5 Years ( )

c). > 5 Years ( )

5. Number of dialysis per month

a). < 5 times ( )

b). 6 - 10 times ( )

c). 11 - 15 times ( )

d). > 15 times ( )

Part - II

Standardized Numerical Pain Assessment Scale

Sample No. [ ]

Dear Participants,

Please read the each item and circle the number that indicates how much pain you have during Arterio Venous Fistula Puncture in the scale shown below. Each statement is scored as follows.

Score	**Level of Pain**
0	No pain
1 – 3	Mild pain
4 – 6	Moderate pain
7 – 10	Severe pain

APPENDIX-G

Structured Interview Questionnaire (Tamil).

ஒப்புதல் படிவம்

அன்னை மீனாட்சி செவிலியர் கல்லூரியில் முதுநிலை அறிவியல் (செவிலியர்) இரண்டாம் ஆண்டு படிக்கும் திருமதி.சிவகாமி அவர்கள், இரத்த சுத்திகரிப்பு செய்வதற்காக ஊசி போடும் போது ஏற்படும் வலியை குறைப்பதற்காக பனிக்கட்டியின் மூலம் அளிக்கப்படும் சிகிச்சையில் [கிரையோதெரபி] எந்தவிதமான பக்கவிளைவுகளும் இல்லாமல் வலியின் அளவு குறையும் என்பதை அவர்கள் அளித்த விளக்கத்தின் மூலம் அறிந்துகொண்டேன். ஆகவே _____வசிக்கும் _____என்கிற நான் இதன் மூலம் ஒப்புதல் அளிக்கிறேன்.

இடம்: இப்படிக்கு,

நாள் :

பகுதி - I

சமுதாயக்காரணிகள்

குறிப்பு: தகுந்த இடத்தில் (✓) குறி இடவும்

வரிசை எண் ( )

1. வயது
   a) 18 - 27 ( )
   b) 28 - 37 ( )
   c) 38 - 47 ( )
   d) 48 - 57 ( )
   e) > 57 ( )

2. பாலினம்
   a) ஆண் ( )
   b) பெண் ( )

3. கல்வித்தகுதி
   a). படிப்பறிவு அற்றவர் ( )
   b). ஆரம்பக்கல்வி ( )
   c). உயர்நிலைபள்ளிக்கல்வி ( )
   d). மேல்நிலைப்பள்ளிக்கல்வி ( )
   e). பட்டப்படிப்பு ( )

4. எவ்வளவு காலமாக இந்நோய் உள்ளது?
   a) < 1 வருடம் ( )
   b) 2 - 5 வருடம் ( )
   c) > 5 வருடம் ( )

5. ஒரு மாதத்திற்கு எத்தனை முறை இரத்த சுத்திகரிப்பு செய்கிறீர்கள்?
   a) < 5 முறை ( )
   b) 6 - 10 முறை ( )
   c) 11 - 15 முறை ( )
   d) > 15 முறை ( )

பகுதி - II

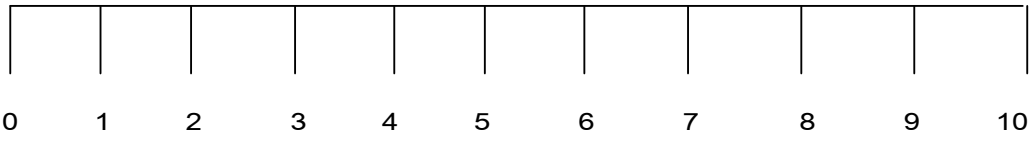
வலியின் அளவை அளத்தல்

வரிசை எண் [ ]

மதிப்பிற்குரியோரே,

தங்களுக்கு இரத்த சுத்திகரிப்பு செய்வதற்காக ஊசி போடும் போது ஏற்படும் வலியின் அளவை கீழ்கண்ட அளவுகோலில் மதிப்பிடவும். இதில்

0	-	வலி இல்லை
1 – 3	-	குறைவான வலி
4 – 6	-	மிதமான வலி
7 – 10	-	அதிகமான வலி



APPENDIX-H

CRYOTHERAPY PROCEDURE

DEFINITION

A Cryotherapy is the locai or general use of low temperature in medical therapy or the removal of heat from the body part.

PURPOSES

- To reduce the muscle spasm
- To reduce the pain
- To reduce the inflammation
- To stop the desire to scratch areas that itch.

INDICATION

- To reduce pain in Arthritis
- To reduce pain in puncture
- To stop bleeding in injuries

CONTRAINDICATIONS

- Skin being treated with radiation therapy
- Severe injury
- A wound in the healing phase
- Areas that have poor circulation

PREPARATION **OF THE PATIENT**

- Explain the procedure to the patient
- The area to be used should be clean and try
- Provide privacy

PREPARATION OF THE ARTICLES

- A bowl with Ice cubes
- Gloves
- Mackintosh with towel
- Kidney Tray
- Screen

PROCEDURE:

ACTION	RATIONALE
1. Explain the procedure to the patient	To gain the cooperation
2. Provide Privacy	To reduce embarrassment
3. Keep all the needed articles ready	To save the true
4. Place the mackintosh with towel above the pillow	To protect the pillow from wetting
5. Place the Contra lateral arm over the towel.	For Good Exposure.
6. Fill the glove with ice cubes and start giving ice massage at the web between the thumb and index finger for 10 minutes before puncture and continue through out the puncturing procedure.	To reduce the AVF Puncture related pain.

AFTER PROCEDURE CARE :

Once the procedure over record the pain score in numerical pain scale	To check the effectiveness of cryotherapy on AVF Puncture related Pain
Provide the comfortable position to the patient.	To promote comfort.
Replace all the articles	To keep the environment clean
Record the procedure with date, time and patient's response to the procedure.	To protect our self from legal problem.